

Infection kinetics and host specificity of Methicillin-resistant *Staphylococcus aureus* (MRSA) in pigs

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Abstract

In this study, we investigated the colonisation kinetics and host specificity of three different clonal lines of MRSA (ST8, ST9 and ST398).

MRSA prevalence on skin, nasal mucosa, conjunctiva, faecal shedding and distribution patterns of MRSA in internal organs in weaning piglets are studied.

Introduction

The transmission of MRSA and its different clonal lines in practice, as well as the influencing factors of a transmission are largely unclear in the field of animal husbandry (2). It is known that MRSA can pass from animals to humans. Moreover people with direct daily contact to animals such as farmers, holders of livestock and pets, veterinarians and the staff in slaughterhouses show a higher colonization with MRSA than those without frequented contact to animals (1).

With regard to MRSA the number of studies in larger domestic animals is increasing. However these are mainly field studies dealing with the prevalence of MRSA (3) carried out in practice, with naturally contaminated animals in farms, barns and slaughterhouses. There are no previous reports about the rate of recovery of MRSA in internal organs with regard to animal experiments with large domestic animals.

Material and Methods

A pool of 58 piglets were randomly divided into four test groups and one control group. Three test groups were infected with MRSA ST8, MRSA ST9 and MRSA ST398, respectively. The fourth group was a fusion of MRSA ST398 infected and non infected "sentinel" animals.

Clinical symptoms, the nasal, conjunctival and skin colonisation of MRSA, faecal excretion and organ distribution of MRSA, as well as different environmental samples were examined.

Results

After nasal application with MRSA piglets of all four test groups showed no clinical signs of an MRSA infection. MRSA was present on the nasal mucosa, skin and conjunctiva in all four test groups, including all sentinel animals. Likewise, faecal excretion and internal colonization of MRSA ST8, ST9 and ST398 could be shown in each group. Colonization was less efficient with the MRSA ST9 strain (originated from the poultry food chain) as indicated by a lower proportion of positive nasal swabs and a numerically reduced colonization of internal organs, feces and skin, in comparison to the ST8 and ST398 groups.

Discussion

MRSA strains of the clones ST8, ST9 and ST398 were able to colonize the nasal mucosa and to real infect different inner organs of all pigs and, furthermore, to contaminate the environment throughout the whole study period. However, results of our study suggest existing strain specific colonization mechanisms of the different MRSA types that might be associated with a certain degree of host specificity.

References

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